Also collected for Dr. Hungerford by Mr. Boxall. Referable to the section *Planispira*. Type in the Natural History Museum.

ENNEA (HUTTONELLA) SEATONI, sp. nov. (Plate XXIX. figs. 15–19.)

Shell cylindric, whitish, narrowly rimate; whorls 11, convex, sutures deep, very slightly decreasing in size upwards, the upper two smooth, shining, the others finely but prominently ribbed, the last expanded and free towards the aperture; aperture oval, nearly vertical; peristome thickened inwards, the columellar margin with a deep circular incision extending to the suture of the penultimate whorl, above this cavity the margin of the peristome runs back into the interior of the aperture, forming a strongly developed lamella, opposite which there are two obscure teeth on the inner part of the peristome well within the aperture. Length $\frac{3}{8}$ inch.

Hab. Tenasserim, limestone rocks east of the Mooley-it mountain near the Siam frontier.

Only a single example was found when visiting this mountain with Col. Seaton, the Conservator of Forests for the Tenasserim provinces. Its nearest ally is *Ennea cylindroidea*, Stoliczka, which is, however, a much smaller shell.

DESCRIPTION OF PLATE XXIX.

Figs. 1, 2, 3. *Nanina subcastor*, p. 313.
4, 5, 6. *Trochomorpha subnigritella*, p. 314.
7, 8, 9. *Helix colletti*, p. 314.
10, 11, 12. *Helix shanica*, p. 314.
13, 14. *Macrochlamys peringundensis*, p. 313.
15, 16, 17, 18, 19. *Ennea (Huttonella) seatoni*, p. 315.

3. On the Fossil Remains of Species of the Family *Giraffidæ*. By Dr. C. J. FORSYTH MAJOR[1].

By far the most numerous remains met with in the fossiliferous deposit of Samos explored by me in 1888 and 1889 appertain to a new member of the family Giraffidæ. The rich materials at my command furnish satisfactory knowledge of this new form, and at the same time suggest novel considerations concerning the various forms already described.

Falconer and Cautley, in describing a fossil Giraffe discovered in the Siwaliks, wrote as follows:—"The Giraffe has hitherto been confined to a single species, and has occupied an isolated position in the order to which it belongs. It may be expected that, when the ossiferous beds of Asia and Africa are better known, other intermediate forms will be found, filling up the wide interval which now separates the Giraffe from the antlered ruminants, its nearest allies in the order according to Cuvier and Owen"[2]. This was written 47 years ago.

[1] Communicated by the President.

[2] H. Falconer and Capt. P. T. Cautley, "On some Fossil Remains of *Anoplotherium* and Giraffe, from the Sewalik Hills," Proc. Geol. Soc. Lond. no. 98, 1844.

We shall consider on the present occasion how far the prediction has been fulfilled, and see at the same time that the authors of the 'Fauna Antiqua Sivalensis' have themselves contributed to realize their anticipation.

1. Giraffa.

First, as to the forms ascribed to the genus *Giraffa* itself. There is one species which for nearly 50 years has haunted palæontological papers, from which it is high time that it should disappear. This is the *Giraffa* (*Camelopardalis*) *biturigum*, Duv., said to come from a Tertiary deposit at Issoudun near Lyons[1]. Anyone who examines with a little attention this supposed fossil, now preserved in the Museum of the Jardin des Plantes, may perceive at once that we have before us no fossil whatever, but the mandibular ramus of a recent specimen of *Giraffa camelopardalis*. It was found at the bottom of a dry well in the courtyard of a house belonging to a chemist, and it seems to have found its way from the apothecary's shop to the place where it was discovered, in order to render it more valuable.

Besides this spurious fossil, half a dozen Tertiary forms have been ascribed to the genus *Giraffa*. The family is beyond doubt; but though we cannot for the moment assign them to any other genus than *Giraffa*, this reference ought, in my opinion, to be considered as provisional. In Palæontology, even when we assign a generic name to some form imperfectly represented, it is with the reserve, though sometimes unexpressed, that more complete finds will modify the original opinion.

The form which appears to have the best claims to rank as a species of the genus *Giraffa* is the *Giraffa sivalensis* (Falc. & Cautl.), with which we have been made more thoroughly acquainted by Lydekker's description[2], founded both on teeth and bones, and leading to the conclusion that the Siwalik Giraffes were constructed on the same plan as the living species. Even in this case I would not be too positive as to the genus, the skull being unknown, and the reference of the bones and teeth to one and the same form, though very probable, not being beyond all doubt.

[1] Duvernoy, "Sur une mâchoire de girafe fossile découverte à Issoudun (dép. de l'Indre)," Notes communiquées à l'Acad. des Sciences, séances du 15 mai et du 27 novembre 1844; id. Ann. Sc. Nat. 3e série, t. i. p. 136, pl. 2 (1843). See also on the same subject:—

H. Falconer and P. T. Cautley, "On some Fossil Remains of *Anoplotherium* and Giraffe, from the Sewalik Hills," Proc. Geol. Soc. of London, no. 98, 1844, postscript.—Blainville, 'Ostéographie,' Atlas, Genre *Camelopardalis*, pl. ii. (*Camelopardalis biturigum*).—Gervais, 'Zoologie et Paléontologie franç.,' deux. éd., Paris, 1859, p. 142.—A. Gaudry, 'Comptes Rendus de l'Académie des Sciences,' vol. xl. p. 802; séance du 26 novembre, 1860.—R. Owen, 'Palæontology,' 2nd edit., Edinburgh, 1861, p. 409.—A. Gaudry, 'Animaux fossiles et Géologie de l'Attique,' Paris, 1862, pp. 249, 250.—L. Rütimeyer, "Beiträge zu einer natürl. Geschichte der Hirsche," Abh. d. schweiz. paläontol. Gesellsch. vol. viii. Erster Theil, p. 73 (Zürich, 1881).—R. Lydekker, Mem. Geol. Survey of India, ser. x. Indian Tert. and Post-tert. Vertebr. vol. ii. pp. 102, 111 (Calcutta, 1884).

[2] R. Lydekker, *l. c.* vol. ii. pp. 103, 112.

The same remarks apply to the *Giraffa attica* (Gaud. et Lart.), from Pikermi, the limb-bones of which, the only parts known, approximate this form to the living species. Some molar teeth are also doubtfully referred to it. Gaudry himself, who described the remains, calls attention to the fact that, the cranium being unknown, no definite determination is possible [1].

Concerning the *Giraffa vetusta* (Wagner), founded on an incomplete maxillary from Pikermi [2], and the *Giraffa microdon* (Koken) from China, represented by a few molars [3], nothing more can be said than that the teeth are very Giraffe-like and closely approach those ascribed to the *Giraffa attica*.

Lastly, the *Giraffa parva* (Weithofer) from Pikermi [4] has been pronounced of late by its describer [5] to belong to a different genus, which we shall have to consider later.

2. Samotherium [6].

When the first remains of a large ruminant were brought to light by my Greek workmen at Samos, I believed I had found the *Helladotherium*, the large Giraffe-like ruminant discovered at Pikermi by Gaudry. The subsequent discovery of several skulls, all of them hornless, showed at once differences from *Helladotherium*. Two fragments of the frontal, each bearing a horn implanted directly above the roof of the orbit, were so different from what is known in existing Giraffes, as well as in Antelopes and Bovines, that I was not at the time able to classify them. The subsequent discovery, however, of the posterior part of the skull belonging to one of the frontals at once resolved the enigma in quite an unexpected manner, indicating a member of the Giraffidæ provided with horns, but in every other respect so closely identical with the hornless skulls just mentioned that both must evidently be considered as belonging to the same species, the hornless skulls doubtless representing the female sex. This is what I have called *Samotherium boissieri* [7]. Later on was found by me the nearly complete skull now in the British Museum, shown of one-sixth the natural size in the accompanying figure (p. 318).

[1] A. Gaudry,' Animaux foss. et Géol. de l'Attique,' pp. 245–252.

[2] A. Wagner, "Nachträge zur Kenntniss der fossilen Huftbier-Ueberreste von Pikermi," Sitzungsb. der k. bayer. Akademie d. Wissensch. pp. 78–82, fig. 1 (Jahrg. 1861, Bd. ii., München).—K. A. Weithofer, "Beiträge z. Kenntniss der Fauna von Pikermi bei Athen," Beiträge zur Paläontologie Oesterreich-Ungarns (Bd. vi.), Wien, 1888, p. 284, Taf. xvii. (viii.) figs. 1, 2.

[3] E. Koken, "Fossile Säugethiere Chinas," Paläont. Abh. herausgeg. von Dames und Kayser, Bd. iii. Heft. 2, 1885, p. 61, Taf. iii. (viii.). figs. 13–15.

[4] A. Weithofer, "Beiträge zur Kenntniss der Fauna von Pikermi bei Athen," (*l. s. c.*) pp. 281–285, Taf. xvi. (vii.)

[5] A. Rodler und K. A. Weithofer, "Die Wiederkäuer der Fauna von Maragha," Abdruck aus dem lvii. Bande d. Denkschr. der mathem.-naturwiss. Classe der kais. Akademie der Wissensch. Wien, 1890, pp. 6, 10.

[6] Forsyth Major, "Sur un gisement d'ossements fossiles dans l'île de Samos, contemporains de l'âge de Pikermi," Comptes rendus de l'Académie des Sciences, Paris, séance du 31 déc., 1888.

[7] *Loc. cit.*

The principal difference from the skull of the living Giraffe, besides the absence of horns in a certain number of perfectly adult and even partially aged specimens, consists in the position occupied by the horns present in some other crania, these being placed, as already stated, on the very roof of the orbits, whilst in the living animal we see them, as is well known, far more backwards, viz. partly on the parietal and partly on the frontal bones.

First, as to the hornless skulls. Take away the protuberances and

Fig. 1.

Samotherium boissieri.

Side view of skull and mandible of male, one-sixth nat. size. Isle of Samos.

horns in a young skull of the Giraffe, and its affinity with the hornless skulls of *Samotherium* cannot be denied. In these last, as well as in the horned specimens, the superior profile stretches nearly horizontally from the upper part of the occiput towards the snout. The roof of the orbits being made somewhat tumid by pneumatic cavities, even in the hornless specimens, the region between them, occupied in the Giraffe by the so-called unpaired horn, appears hollowed. Another analogy of the superior profile, as well as of the upper contour of the skull of *Samotherium*, is with the skull of the female Elk, which last genus has been brought by Rütimeyer into close relation with the Giraffe [1].

[1] L. Rütimeyer, 'Beiträge zu einer natürlichen Geschichte der Hirsche,' i. pp. 58–72.

As regards the horns of *Samotherium*, I have to state an interesting fact. In the skull of an aged specimen of *Samotherium*, just above the orbits where the large horns are placed in the horned specimens, there occur very small processes separated by a suture from the underlying part of the frontal. It appears that we have before us the same sort of processes as in the living Giraffe. On examination of the large horned skull of the *Samotherium*, a sort of burr is visible on the anterior and interior base of the horn-cores, which apparently corresponds to the coalesced suture. The skull in which the small processes appear above the orbits is evidently that of an aged female, and I think the explanation to be given is that in aged individuals of the female sex, male characters occasionally make their appearance. Rütimeyer has recorded that in an aged female of the Giraffe a sort of stalactitic crust, as he terms it, corresponding to the dermal median process of the male, sometimes covers the medial "horn" [1].

I do not propose to enter here into any detail respecting the dentition and the limb-bones of the *Samotherium*. As to the first, it suffices to remark that the teeth differ from those of the Giraffe only in slight particulars. Whilst the limb-bones in their relative proportions come nearer to what is the rule amongst Ruminants, the few cervical vertebræ collected indicate that the *Samotherium* had a far less elongated neck than the Giraffe.

In the British Museum is preserved a portion of the skull from the ossiferous deposit of Maragha in Persia, which I have identified as the *Samotherium boissieri*. A similar remark may be made in reference to some remains from the same deposits, nearly complete as to the dentition, very imperfect as to the skull, lately described by Rodler and Weithofer under the name of *Alcicephalus neumayri* [2]. The skull being so incomplete, there still remains some doubt as to its *specific* identification with *Samotherium boissieri*.

3. Palæotragus.

A near ally of the *Samotherium* is a ruminant from Pikermi described by Gaudry as an Antelope under the name of *Palæotragus rouenii* [3], as a reference to the figure will at once show. Gaudry entertains some doubts as to the systematic position of *Palæotragus*; he defines it:—"Ruminant qui a des cornes comme les antilopes, quoiqu'il diffère de ces animaux par la plupart de ses caractères" [4]; and farther on, "Si je considère ses cornes, je le classe auprès des antilopes, mais je doute de ce rapprochement, quand je regarde ses molaires semblables à celles des cerfs et de la girafe, son occipital qui rappelle celui d'un âne, sa région pariétale allongée et rectangulaire," etc. [5]

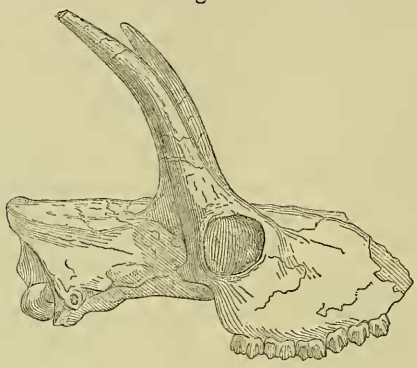
Rütimeyer is less hesitating as to the place which *Palæotragus*

[1] Rütimeyer, *l. c.* p. 66, note.
[2] Rodler und Weithofer, 'Die Wiederkäuer der Fauna von Maragha,' pp. 2–9, Taf. i. fig. 1, Taf. ii., Taf. iii. figs. 1–6, Taf. iv. figs. 1–4.
[3] A. Gaudry, 'Animaux fossiles et Géol. de l'Attique,' pp. 264–267, pl. xlv.
[4] *L. c.* p. 264.
[5] *L. c.* p. 267.

ought to occupy; he says—"Am zutreffendsten scheint *Palæotragus* in heutiger Sprache characterisirt zu sein, wenn man ihn als eine Form von *Aegoceros* (*Hippotragus*) mit noch brachyodontem Gebiss bezeichnen würde"[1].

The only resemblance with the Antelopes, and which seems to have been the reason for assigning to *Palæotragus* a place amongst them, is the position of the horns. Even this character does not quite agree; for I know no instance amongst Antelopes of the horns

Fig. 2.



Palæotragus roueni.

Side view of skull, one-sixth nat. size (after Gaudry). Pikermi, Attica.

being separated by such a large interval, owing to the enormous dilatation of the skull between the orbits, in which character *Palæotragus* agrees as well with the Giraffe as with *Samotherium*; and, moreover, with the latter in the horizontal upper profile of the cranium from the occiput to the snout. If it were not for the equine-like constriction of the occiput of *Palæotragus roueni*, as described by Gaudry, I should not have established a new genus for my Samos remains, but should have united *Samotherium* with *Palæotragus*, so very like are both in every other respect.

A hornless skull from Pikermi, described by Weithofer as *Camelopardalis parva*[2], may turn out to be the female form of the Giraffoid *Palæotragus*. Rodler and Weithofer have of late pronounced this form to belong doubtless to their new genus *Alcicephalus*[3]. This last being synonymous with *Samotherium*, there is no great difference in our respective opinions. The skull of *Camelopardalis parva* being rather incomplete and especially wanting the occipital region, it cannot for the present be decided whether its affinities are with *Samotherium* or with *Palæotragus*.

[1] L. Rütimeyer, "Die Rinder der Tertiär Epoche, nebst Vorstudien zu einer natürlichen Geschichte der Antilopen," Abh. d. schweizer. paläontol. Ges. vol. iv., Zurich, 1877, p. 83.

[2] *L. s. c.*

[3] Rodler and Weithofer, 'Die Wiederkäuer der Fauna von Maragha,' p. 10.

4. Sivatherium; and 5. Hydaspitherium [1].

As is well known, the Siwaliks have yielded the remains of *Sivatherium* and *Hydaspitherium*, about the relations of which there has been a good deal of discussion. I have to recall to mind that Dr. Murie placed the Sivathere in a distinct family, as showing affinities, in his opinion, with several distinct groups of ruminants, but being on the whole most nearly allied to *Antilocapra* [2]. These views as well as those of Rütimeyer have been opposed by Lydekker, who groups the Sivathere and its allies (*Hydaspitherium* and *Bramatherium*) in the same family as the Giraffe, basing his opinion especially on the similarity of the molar teeth, as well as on the transition in the bones of the limbs and neck from *Sivatherium* to the Giraffe, and on some other characters of minor importance [3].

I find it necessary to enter into some detail regarding the views propounded by Rütimeyer [4], who is most positive in his assertion as to *Hydaspitherium*, denying on the one hand that it has any relation whatever with the Giraffe, and on the other hand insisting strongly on its affinities with the *Damalis* group amongst the Antelopes. The form of the forehead, as well as the implantation of the horns, according to Rütimeyer correspond most of all with *Damalis* and *Alcelaphus*. The conformation of the occiput is said to find its nearest analogue in *Alcelaphus* and especially in *A. tora*. On the whole the structure of the cranium of *Hydaspitherium* is characterized as an abbreviation of the *Damalis* skull.

Even if we admit that in *Hydaspitherium* the parietal region be as narrow and as much displaced backwards as in some members of the *Damalis* group (*D. tora*, *caama*, &c.), there would be no sufficient grounds for referring it to these Antelopes, as this same extreme conformation is found not only in the skulls of some species of *Damalis*, but is characteristic besides of *Connochætes*, of several Bovines, and even of male adult skulls of some Ovines, such as *Ovis argali*, *O. polii*, and *O. nahoor*. There is a fossil form, too, found in Samos, *Criotherium*, in which the parietal region is also reduced to a very the narrow zone, behind and under the horn-cores; the distinctness, however, of this form from *Damalis* can be at once determined.

Moreover, the comparison of the *Hydaspitherium* skull with those of the *Damalis* seems to me unjustifiable for other reasons. Rütimeyer starts from the assumption that the parietal region begins in the *Hydaspitherium*, as is generally the case in Ruminants, nearly behind the horn-cores—in other words, that the horn-cores are limited to the

[1] I am obliged to postpone my remarks on *Bramatherium*, having not yet had the opportunity of examining the skull from Perim Island which is preserved in the Museum of the Royal College of Surgeons.

[2] Geol. Mag. vol. viii. 1871, pls. xii. & xiii.—The original memoir on *Sivatherium* is by Falconer and Cautley: "*Sivatherium giganteum*, a new fossil ruminant genus, from the valley of Murkunda, in the Sewalik branch of the Subhimalayan Mountains," Asiatic Researches, vol. xix. 1836, p. 1.

[3] R. Lydekker, *l. c.* vol. ii. pp. 118–142.

[4] L. Rütimeyer, 'Beiträge zu einer natürlichen Geschichte der Hirsche,' i. pp. 79–84.

frontalia. It is, however, a well-known fact that in the Giraffe the parietals participate also in the conformation of the horns. In the skull of a very young Giraffe, such as that which is to be seen in the remarkably instructive exhibition in the Hall of the British Museum, it is evident that the pair of horns are not formed alone by the bony processes which are situated partly on the frontals and to a large extent on the adjacent parietal region, but that those bones themselves are thrust up, the parietals still more than the frontals. It is not possible to demonstrate with certainty the coronal suture in the cast of the *Hydaspitherium* skull[1]. But its comparison with a young Giraffe, and with the so-called skull of *Helladotherium* from the Siwaliks, which is placed by Rütimeyer himself amongst the Giraffidæ[2], is strongly suggestive that in all three the parietal region has about the same extension and continues in the same direction as the frontal region. The horns of *Hydaspitherium*, in my opinion, thus occupy the same position as in the Giraffe—that is to say, on the parietal as well as on the frontal bones, only extending much more forwards than in theliving genus.

In spite of the enormous elevation of the bones which form the brain-case, this last in *Hydaspitherium* is not much shorter than in the hornless skull of the Siwaliks.

Similarly I am inclined to believe that in *Sivatherium* the parietals also take part in the horizontal covering of the skull, so that the analogy with the Gnu and the Bovines, advocated by Rütimeyer[3], is not justified. The posterior antler-like pair of horns, according to my view, evidently arises from the parietals. The anterior pair occupies the same position as the horns of *Samotherium*, the homology with which is completed by the important fact that we can trace a suture between the anterior processes of *Sivatherium* and their supporting frontals.

The supposition as to the extension of the parietalia in *Sivatherium* and *Hydaspitherium* can be definitely proved only when we are able to trace the coronal suture; but even if Rütimeyer's improbable view as to the position of the parietalia were right, there would not be, for the reasons given, sufficient grounds for uniting these fossils with some of the Antelopes.

Be that as it may, the present exposition of facts corroborates Lydekker's view that *Sivatherium* and *Hydaspitherium* are nearly akin to the Giraffe[4].

[1] Lydekker was unable to trace the coronal suture in the original. He says in the description of the skull of *Hydaspitherium megacephalum* in question (Indian Tertiary and Post-Tertiary Vertebrata, vol. i. 1880, p. 163):—"Above the occipital crest the common base of the horn-cores rises almost vertically, somewhat after the manner of the intercoronal ridge of the oxen. It is impossible to say how much of this portion of the cranium is formed by the parietals and how much by the frontals, but I am inclined to think that in the middle line the parietals formed a very narrow strip as in the true oxen."

[2] *L. c.* pp. 74–78.

[3] L. Rütimeyer, 'Beiträge zu einer natürlichen Geschichte der Hirsche,' i. pp. 80–81.

[4] As to *Vishnutherium*, from the Siwaliks, described by Lydekker, I have no new observations of my own to offer, but I completely share Lydekker's views as

6. Helladotherium.

What I have to remark about the so-called *Helladotherium* supports the views above stated. As to the systematic position of *Helladotherium duvernoyi*, Gaud., from Pikermi [1], Rütimeyer agrees with Gaudry and Lydekker, that we have to do with a form related to the Giraffe [2].

With the *Helladotherium* of Pikermi Gaudry united a hornless skull from the Siwaliks, which had been originally considered by Falconer as a female *Sivatherium* [3]: Gaudry adds that Falconer himself inclines towards this opinion [4]. The French author confines himself to pointing out a few differences between the Pikermi and the Siwalik form which, in fact, as Lydekker remarks, would not be sufficient to justify a specific distinction of the two specimens. We have a nearly complete description of the Indian skull by Rütimeyer [5], not from the original, but from the drawing in the 'Fauna Antiqua Sivalensis.' Rütimeyer also unites the two specimens. The rather important differences between the two skulls he ascribes partly to the artist of the French plates, partly to the deformation of the Pikermi skull by crushing. I have been able to convince myself from an examination of the original Pikermi skull in Paris that the drawing is correct, and that the deformation is no more than Gaudry himself admitted ("un peu comprimé de haut en bas"); so that the remarkable elongation of the parietal region of the Pikermi skull, which presents difficulties to Rütimeyer, is perfectly natural. As may be seen from the accompanying sketches of the *Helladotherium* from Pikermi (fig. 3, p. 324) and the so-called *Helladotherium* from the Siwaliks (fig. 4 B, p. 325) the superior profile in the crania is remarkably different. The region above and behind the orbits is slightly hollowed in the Greek *Helladotherium*, whilst in the Siwalik skull a convexity is visible in the same position. As appears from the upper view of the Siwalik skull (fig. 4 A, p. 325), the highest point of the elevation in question would correspond to the hinder extremity of the nasals. Such being the case according to the drawing, the nasals would have extended backwards beyond the orbits, an arrangement unknown among Ruminants. A close examination of the original specimen shows, however, that this cannot be. As the cranial roof has been removed in this place, we see clearly that here are pneumatic

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expressed in the summary of the chapter devoted to this genus. "Whether these remains belong to one or to several species or genera, they unmistakably indicate a connecting link (or links) between the Sivathere and the Giraffe which so effectually bridges over the gap hitherto existing between these animals, as to do away with all family distinction between the two." (Indian Tertiary and Post-Tertiary Vertebrata, vol. ii. p. 116.)

[1] A. Gaudry, 'Animaux fossiles et Géologie de l'Attique,' pp. 252–264, pls. xli.–xliv.

[2] L. Rütimeyer, 'Beiträge zu einer natürl. Geschichte der Hirsche,' i. pp. 74–78.

[3] A description of the Plates in the 'Fauna Antiqua Sivalensis,' Supplementary Plate A. figs. 1–1 *c* (H. Falconer, Palæontological Memoirs and Notes, 1868, vol. i. p. 538).

[4] *L. c.* p. 260.

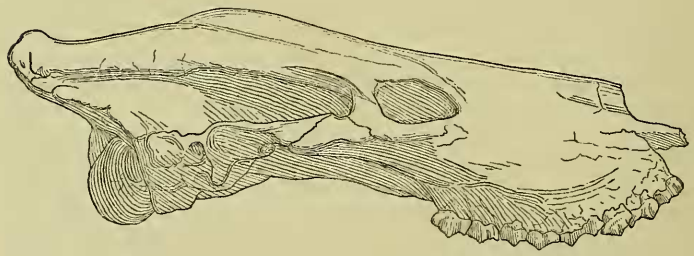
[5] *L. c.* pp. 75–78.

cavities filled with matrix exactly the same as those beneath the so-called unpaired horn of the Giraffe. So that what in the figure appears as the posterior half of the nasals is in reality situated in the frontal region behind the nasals. We have thus here the homologue of the median protuberance of the Giraffe.

The postorbital portion in the Siwalik hornless skull is a little more elongated than in *Sivatherium* and *Hydaspitherium*, and would have exactly the form of *Hydaspitherium* if the horns of this genus were removed; in the hornless skull the superior profile is nearly horizontal.

In the *Helladotherium* from Pikermi the parietal region is more elongated still, as has been already stated. Gaudry describes on its middle a feeble elevation of 2 cm. by 8 cm. in length, adding that it corresponds perhaps to a sort of horn or central pyramid. The examination of the original preserved in the Paris Museum showed me that we have in reality two crests, as is visible too in the side view, diverging a little forwards and circumscribing a sort of elevated plateau, which in front is about 1 decim. broad, at the back 75 millim.

Fig. 3.



Helladotherium duvernoyi.

Side view of skull, one-sixth nat. size (after Gaudry). Pikermi, Attica.

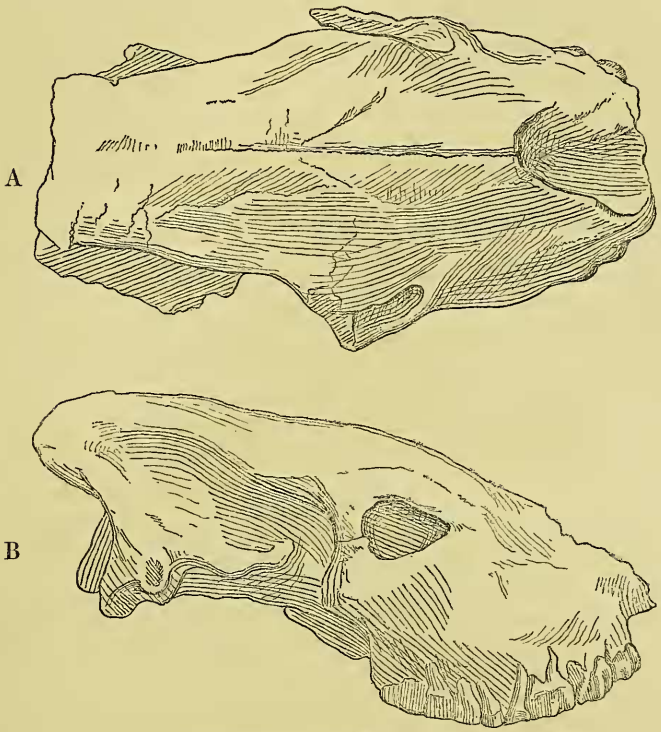
In front of these the profile runs nearly horizontal as in *Samotherium*, and very different from the proclivous direction in the Siwalik skull, which besides is much higher in this part.

The orbits in both skulls are relatively small as in *Sivatherium* and *Hydaspitherium*; in the *Helladotherium* from Pikermi they are situated farther back.

There are several other differences between the two skulls which for the present purpose may be omitted. On the whole my conclusion is that, apart from a general likeness, they are so different from each other, that far from belonging to the same species they must even be ascribed to different genera. The Siwalik skull, except its being hornless, approaches so near to the horned forms of the Siwaliks just mentioned, but especially to *Hydaspitherium*, that I think the original view of Falconer, which later on was shared by Murie, is not so far from the truth as has been since supposed. Falconer considered it to be the female of *Sivatherium*, the only one of the three

allied horned forms (*Sivatherium*, *Hydaspitherium*, *Bramatherium*) then known. The Sivatherium having somewhat different molars, whilst the teeth of *Hydaspitherium*, according to Lydekker, are not to be distinguished from those of the so-called *Helladotherium* from the Siwaliks, whilst, besides, the configuration of the skull approaches more to *Hydaspitherium*, I think that we have before us the female skull of a genus of which the male form cannot have differed much from the form presented by *Hydaspitherium megacephalum*, Lyd.

Fig. 4.



Sivatherium giganteum (female).

Upper view (A) and side view (B) of skull, one-sixth nat. size (after Falconer and Cautley). Siwalik Hills, India.

I wish to be far less positive as to the sex of the *Helladotherium* skull from Pikermi. Having before us in the Pikermi fossil a geologically older form, the development of horn-like appendages even in the male may not have advanced beyond the stage shown in the specimen figured by Gaudry.

At any rate we cannot be surprised at the general likeness of the

two forms. The female skulls being more or less in all mammals, but especially in Ruminants, more *conservative* than the skulls of males, the resemblance of the Siwalik skull to a more generalized type, as represented by the *Helladotherium* skull of Pikermi, is not more than we might have anticipated.

June 2, 1891.

Prof. Flower, C.B., LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of May 1891 :—

The registered additions to the Society's Menagerie during the month of May 1891 were 163 in number. Of these, 96 were acquired by presentation, 41 by purchase, 4 by exchange, 10 were born in the Gardens, and 12 were received on deposit. The total number of departures during the same period, by death and removals, was 89.

Amongst the former special attention may be called to the following:—

1. A female Water-buck Antelope (*Cobus ellipsiprymnus*) from British East Africa, presented by George L. Mackenzie, Esq., F.Z.S. This is a very acceptable arrival, as making a pair with the male of the same Antelope presented by Mr. Mackenzie in November last (see P. Z. S. 1890, p. 589).

2. Three Blanford's Rats (*Mus blanfordi*) from the Shevaroy Hills, Madras, presented by Mr. W. L. Sclater, F.Z.S., Deputy Superintendent of the Indian Museum, Calcutta. This species is new to the Collection.

Mr. Sclater made some remarks on animals which he had noticed during a recent visit to the Zoological Gardens of Paris, Ghent, Antwerp, Rotterdam, Amsterdam, and The Hague.

In the Jardin d'Acclimatation at Paris the colony of breeding Penguins, which Mr. Sclater had also inspected in the summer of 1890, was of special interest to the ornithologist. Twenty-two examples of the Black-footed Penguin (*Spheniscus demersus*) were kept in an open wire enclosure. Many of these had paired and nested in some wooden dog-kennels which had been placed in the enclosure. Last year five birds had been bred, and only one of these had been lost.

Of the three Sea-Lions living in the Jardin d'Acclimatation, one adult male appeared to be referable to *Otaria stelleri* and not to *O. gillespii*, the species usually brought from the Pacific coast of America, from which it seemed to be distinguishable externally by the sudden elevation of the front part of the cranium. But this determination would require confirmation after the death of the specimen.

A remarkable hybrid Pheasant in this Garden was said to have